UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte CONRAD OLIVER GARDNER

Appeal No. 2005-1094
Application No. 08/896,514

ON BRIEF[1]

Before MCQUADE, NASE and BAHR, Administrative Patent Judges.

BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's rejection of claims 34-37, 40, 41, 46-51 and 54-61. Claims 30-33 stand allowed and claims 38, 39, 52 and 53 stand objected to as depending from rejected claims but are otherwise indicated as allowable (answer, page 2). No other claims are pending in this application.

---

[1] The appellant presented an oral argument to a panel of Judges Cohen, Staab, and Bahr on November 17, 2004 (then Appeal No. 2004-2225). The application was subsequently remanded to the examiner. Judges Cohen and Staab have retired from the Board. The appellant was offered an opportunity to re-argue this case before the present panel but declined. Consequently, this appeal is being decided on the basis of the answer and briefs.

BACKGROUND

The appellant's invention relates to a hybrid motor vehicle powered by an electric motor under some conditions and by an internal combustion engine under other conditions. A copy of the claims under appeal is set forth in the appendix to the appellant's brief.

The Prior Art

The examiner relied upon the following prior art references of record in rejecting the appealed claims:

Lynch et al. (Lynch)	4,165,795	Aug. 28, 1979
Kenyon	4,438,342	Mar. 20, 1984
Ellers	4,923,025	May 8,1990

The Rejections

The following rejections are before us for review.

Claims 46-49, 55, 57, 58, 60 and 61 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the appellant regards as his invention.

Claims 34-37, 50, 54 and 57-61 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ellers.

Claims 37, 40, 46, 47, 51, 55 and 61 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kenyon.

Claims 37, 40, 50, 51, 54, 55 and 57-60 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lynch.

Claim 41 stands rejected under 35 U.S.C. § 103 as being unpatentable over Ellers.

Claim 56 stands rejected under 35 U.S.C. § 103 as being unpatentable over Lynch.

Claim 48 stands rejected under 35 U.S.C. § 103 as being unpatentable over Kenyon in view of Ellers.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the answer (mailed March 3, 2004) for the examiner's complete reasoning in support of the rejections and to the "SUBSTITUTE SECOND SUPPLEMENTAL BRIEF ON APPEAL" (filed December 8, 2003 - hereinafter "the brief") and reply brief (filed May 3, 2004) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, to the declaration of Philip C. Malte submitted with the brief, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The Indefiniteness Rejections

The examiner has rejected claim 46, as well as claims 47 and 48 depending therefrom, and claim 61 as being indefinite on the basis that it is not clear whether, in each claim, the second occurrence of "wheels" ("traction wheels" in claim 46 and "drive wheels" in claim 61) refers to a second set of wheels or to the same set of wheels as the first occurrence. We find that the claims are both open-ended in this regard, such that the claims read on either an arrangement wherein the engine is coupled to a first set of wheels and the electric motor is coupled to a second set of wheels or an arrangement wherein both the engine and the motor are coupled to the same set of wheels. We agree with the appellant, however, that this a matter of breadth, not indefiniteness. Just because a claim is broad does not mean that it is indefinite. See In re Johnson, 558 F.2d 1008, 1016 n.17, 194 USPQ 187, 194 n.17 (CCPA 1977); In re Miller, 441 F.2d 689, 693,169 USPQ 597, 600 (CCPA 1971); In re Gardner, 427 F.2d 786, 788,166 USPQ 138,140 (CCPA 1970) and Ex parte Scherberich, 201 USPQ 397, 398 (Bd. App. 1977). We shall not sustain either of these rejections.

Claim 49 stands rejected as being indefinite because, according to the examiner, it is unclear what is meant by "the period of torque transfer" and there is no proper antecedent basis for this limitation in the specification. The phrase "controls the period of torque transfer" is not self-explanatory or clear on its face. Like the examiner, we find no antecedent basis in the appellant's underlying disclosure for controlling "the period

of torque transfer" between the first and second torque flow paths as recited in claim 49 to help clarify what is meant by that terminology and it is not clear from the context of the claim language what is meant thereby. We therefore find ourselves in agreement with the examiner that one of ordinary skill in the art would not be able to determine, with any certainty, the scope of claim 49 and conclude that claim 49 does not meet the definiteness requirement of the second paragraph of 35 U.S.C. § 112. The legal standard for definiteness is whether a claim reasonably apprises those of skill in the art of its scope. See In re Warmerdam, 33 F .3d 1354, 1361, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). The rejection is sustained.

We shall not sustain the examiner's rejection of claims 55, 57 and 60 as being indefinite. Initially, we note that the purpose of the second paragraph of 35 U.S.C. § 112 is to basically insure, with a **reasonable** degree of particularity, an **adequate** notification of the metes and bounds of what is being claimed. See In re Hammack, 427 F.2d 1378, 1382, 166 USPQ 204, 208 (CCPA 1970). As the court stated in In re Moore, 439 F .2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971), the determination of whether the claims of an application satisfy the requirements of the second paragraph of Section 112 is

> merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a **reasonable** degree of precision and particularity. It is here where the definiteness of language employed must be analyzed -- not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be

> interpreted by one possessing the ordinary level of skill in the pertinent art. [Emphasis ours; footnote omitted.]

In this case, the lack of strict antecedent basis in the claims for "cruise mode" does not render the metes and bounds of claims 55, 57 and 60 indefinite. One of ordinary skill in the art reading these claims would readily appreciate, from the definition on page 2 of appellant's specification, that "in the [said] cruise mode" as used in claims 55, 57 and 60 means "when rapidly shifting power and speed demands are not occurring for predetermined periods of time." We note, moreover, that this definition of "cruise mode" is actually recited in claim 57.

The rejection of claim 58 as being indefinite is sustained. This claim recites an internal combustion engine "having a horsepower approximately 20 to 30 percent of the horsepower of an equivalent weight internal combustion only powered vehicle." This recitation, in order to have any ascertainable meaning, presumes that a standard weight to horsepower ratio exists for internal combustion only powered vehicles. As pointed out by the examiner on page 5 of the answer, this is simply not the case.

The Anticipation Rejections

We turn first to the rejection of claim 34 as being anticipated by Ellers. For the reasons which follow, we shall sustain this rejection, as well as the like rejection of dependent claims 35 and 36 which the appellant has not argued separately from claim 34.

The appellant argues that Ellers fails to meet the claim limitation "said control circuit activating second coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition." As pointed out on page 4 of the Malte declaration, generally speaking, Ellers' internal combustion engine (ICE) 21 is started only when the vehicle speed reaches 55 mph (the cruise mode on condition). We also note, however, that Ellers also discloses a fail safe mode in which, when batteries are low, "[r]unning on electric [i.e., in the cruise mode off condition], torque converter 35 is momentarily energized by processor control 25, automatically starting ICE by rotation from rear wheels through torque converter" (column 2, lines 55-58) and clutch 65 is closed to couple the ICE to the DC generator 63. Under such a fail safe mode, therefore, the control circuit of Ellers activates a coupling means (clutch 65) for connecting the ICE to an electric generator 63 for charging a battery 5 (column 8, line 20) to thereby power the electric motor 7 to drive the vehicle as a series hybrid. This fully satisfies the claim limitation cited above.

As for the limitation in claim 34 "said combustion engine running in an optimum mode at substantially constant speed and power output level" alluded to on page 5 of the reply brief, Ellers emphasizes that

> no gear shift or throttle control is provided for the internal combustion engine. While this feature makes absolute use at maximum efficiency of the ICE, it makes it impossible to accelerate with the ICE, making a fail safe DC supply necessary [column 2, lines 40-41].

This makes it clear that Ellers' ICE runs in an optimum mode at substantially constant speed and power output whenever it is running, thereby satisfying the claim language at issue. We see no requirement in claim 34 that the ICE actually run at all times during operation of the vehicle.

Turning next to claim 37, the appellant argues that Ellers fails to satisfy the last paragraph of the claim and we agree. The last paragraph of claim 37 recites a control means which controls whether to transfer the force from the engine to a generator or wheels in accordance with a vehicle running state, transferring the force to wheels when the running state is more than a predetermined value and transferring the force to the generator when the running state is less than a predetermined value. Stated differently, we interpret this limitation as requiring a control means which selects between transferring the force from the engine to a generator or to wheels depending on whether a vehicle running state is more or less than a predetermined value. Ellers' ICE 21 is coupled to the rear wheels by continuously variable torque converter 35 and to the generator 63 by fail safe clutch 65. The processor control 25 controls the torque converter 35 depending on the speed of the vehicle (one vehicle running state) and the clutch 65 depending on the battery voltage level sensed (a second running state). For example, when the vehicle speed is more than 55 mph, the processor control causes the torque converter 35 to be energized, thereby coupling the ICE to the wheels and starting the ICE. Whenever a low voltage is sensed, regardless of vehicle speed, the

processor control 25 closes the clutch 65 to couple the ICE to the generator 63.[2] The clutch 65 is closed when the ignition key is ON only when battery voltage is low (column 2, lines 47-50). The processor control 25 of Ellers thus does not make a selection between force transfer from engine to wheels or engine to generator in accordance with a single vehicle running state, as called for in the last paragraph of claim 37. The rejection is reversed.

We turn next to the rejection of claim 50 as being anticipated by Ellers. The appellant argues that Ellers lacks "said cruise mode occurring when rapidly shifting power and speed demands are not occurring for predetermined periods of time" as recited in claim 50. Ellers' electric motor 7 is powered and propels the vehicle at speeds below 55 mph (cruise mode off). At speeds above 55 mph, when the operator is not pushing down hard on the accelerator pedal and is not braking (i.e., rapidly shifting power and speed demands are not occurring), the power to the motor is cut off and the ICE is started and propels the vehicle. If the operator pushes down hard on the accelerator pedal, power is supplied to the motor and the vehicle is propelled by a combination of the ICE and the motor. If the operator brakes, voltage is removed from the torque converter, thus interrupting operation of the ICE and returning the vehicle to solely electric drive (column 4, first paragraph). Thus, the "cruise mode" of Ellers, in

---

[2] When a low voltage is sensed at a speed below 55 mph (ICE not running), the torque converter is momentarily energized by the processor control 25 to start the ICE by rotation from rear wheels through the torque converter.

which the vehicle is powered solely by the ICE, occurs when the speed exceeds 55 mph and the operator is neither pushing down hard on the accelerator nor braking (i.e., when rapidly shifting power and speed demands are not occurring), thereby meeting the claim limitation at issue. The rejection is sustained.

The rejection of claim 54 as being anticipated by Ellers is sustained. Ellers discloses a hybrid vehicle comprising an electric motor 7, an internal combustion engine 21 and a cruise mode logic control circuit (Figure 2). The logic control circuit is responsive to vehicle speed to cut power to the electric motor and energize the torque converter 35 to start the engine when a speed of 55 mph is reached and is responsive to accelerator pedal information (column 4, lines 17-23) to restore power to the electric motor, so that both the engine and the electric motor are in operation if the operator pushes down hard on the accelerator pedal 45, during cruise mode, when the vehicle is being propelled by the engine.

With respect to the rejection of claim 57 as being anticipated by Ellers, the appellant argues that Ellers lacks the step of "utilizing the internal combustion engine power in said cruise mode and utilizing the electric motor power primarily when conditions for said cruise mode conditions [*sic*] are not satisfied, the cruise mode occurring when rapidly shifting power and speed demands are not occurring." This argument is not well taken.

Ellers discloses using the electric drive motor when the vehicle speed is below 55 mph and using the internal combustion engine when the vehicle speed reaches or exceeds 55 mph. If the driver pushes down hard on the accelerator pedal while the engine is propelling the vehicle, the electric motor is energized and both the motor and the engine propel the vehicle. If the driver hits the brake while the vehicle is being propelled by the engine, voltage is removed from the torque converter 35 to interrupt operation of the engine and the electric motor is energized. Thus, the electric motor power is used when the rapidly shifting power and speed demands are occurring (acceleration up to 55 mph and rapid acceleration or braking at speeds above 55 mph) and engine power is used when the speed exceeds 55 mph and neither rapid acceleration nor braking are occurring.[3] Ellers therefore satisfies the limitation alluded to by the appellant. The rejection is sustained.

We shall not sustain the examiner's 35 U.S.C. § 102 rejection of claim 58 as being anticipated by Ellers. For the reasons expressed above in our affirmance of the 35 U.S.C. § 112, second paragraph, rejection of claim 58, this claim is indefinite. Therefore, the prior art rejection must fall because it is necessarily based on speculative assumption as to the meaning of the claim. See In re Steele, 305 F .2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962). It should be understood, however, that our decision

---

[3] As discussed above, engine propulsion is also used, in combination with electric motor power, when rapid acceleration is demanded, but nothing in the claim language excludes this.

in this regard is based solely on the indefiniteness of the claimed subject matter, and does not reflect on the adequacy of the prior art evidence applied in support of the rejection.

With regard to the rejection of claim 59 as being anticipated by Ellers, the appellant appears to be arguing that the Ellers battery 5 is not a "fast charge-discharge battery" as recited in the claim (brief, page 5). The appellant has defined a fast charge-discharge battery as "a battery capable of faster charge than the current lead acid batteries, e.g., nickel cadmium battery, capacitor-battery storage device" (specification, page 7). We thus interpret "fast charge-discharge battery" as used in the appellant's claims 55 and 59 as a battery capable of faster charge than the current lead acid batteries. The examiner has stated, on page 12 of the answer, that "rechargeable batteries used in any vehicle, particularly hybrid vehicles, are inherently 'fast charge-discharge' batteries." Under principles of inherency, when a reference is silent about an asserted inherent characteristic, it must be clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Continental Can Co. v. Monsanto Co., 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991). In this case, Ellers is silent as to what type of batteries are used and the examiner has not presented any explanation or evidence establishing that the batteries used in the Ellers hybrid vehicle are necessarily batteries capable of faster charge than the current lead acid batteries.

As such, the examiner's position that their use in Ellers is inherent is not well taken. While the heavy use of battery power, and particularly in situations where immediate acceleration is required, in hybrid vehicles such as that of Ellers may provide incentive for one of ordinary skill in the art to select a fast charge-discharge battery for use therein, the examiner's rejection of this claim is one of anticipation under 35 U.S.C. § 102; the issue of the obviousness of using fast charge-discharge batteries is not before us in this appeal. The rejection of claim 59 as being anticipated by Ellers is reversed.

Turning next to the rejection of claim 60 as being anticipated by Ellers, the appellant argues that Ellers utilizes only speed sensor switches and thus does not include controlling the operation of the engine and motor in response to a plurality of vehicle operating parameters, as called for in the claim (brief, page 6). This is a mischaracterization of Ellers, which clearly provides control of the engine and motor in response to the speedometer signal (switching from electric motor to engine when 55 mph is reached or exceeded) and movement of the accelerator pedal (restoring power to the motor if rapid acceleration is demanded to propel the vehicle with both motor and engine power) or brake (cutting off the engine and restoring power to the electric motor). As such, Ellers controls operation of the engine and motor in response to a plurality of vehicle operating parameters. The rejection is sustained.

The examiner also rejected claim 61 as being anticipated by Ellers. The appellant argues that Ellers lacks "means for coupling said power transfer means for transferring an output power of said electric motor from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the vehicle" and "means for uncoupling said power transfer means for transferring an output power of said engine from the output shaft thereof to drive wheels of the hybrid vehicle upon starting the hybrid vehicle." It is not apparent to us why the "means for coupling ... said electric motor ..." does not read on the transmission 9, or the mechanical clutch thereof (column 4, line 62) and why the "means for uncoupling ..." does not read on the torque converter 35. While the torque converter 35 of Ellis also acts to "crank" the engine, by transferring the rotation of the rear wheels thereto, it also acts to couple and uncouple the engine from the rear wheels, via differential 19. Inasmuch as the appellant's argument does not persuade us of any error on the part of the examiner in making this rejection, it is sustained.

The rejection of claim 37 as being anticipated by Kenyon is not sustained. Kenyon's engine 10 is always coupled to the generator (alternator 34), the output of which can either be in series with or in parallel with the battery (battery pack 50) powering the motor 54 or can power the motor 54 with the battery eliminated from the circuit. Thus, Kenyon's control system cannot reasonably be characterized as controlling whether to transfer a driving force generated by the engine to a power

generator or wheels as recited in claim 37. We also cannot sustain the rejection of claim 40, which depends from claim 37, as being anticipated by Kenyon.

With respect to the rejection of claim 46 as being anticipated by Kenyon, the appellant simply argues in the brief (page 6) that "[t]he logic control circuit of claim 46 is not seen in Kenyon" and in the reply brief (page 8) that "[a] logic control circuit which performs an arithmetic logic function is not seen in Kenyon."[4] Kenyon discloses opening the circuit to the motor and coupling the engine to differential 14 using a one-way clutch in highway driving and de-coupling the engine from the differential and closing the circuit to the motor to have the motor alone propel the vehicle in city driving, with clutching and switching to open and close the motor circuit being accomplished automatically by well known speed sensing devices (column 4 to column 5). The engine continues to run, transferring power to the alternator, when the engine is de-coupled from the differential 14 by the clutching/switching circuit. This appears to respond fully to the logic control circuit limitation of claim 46. The rejection of claim 46, as well as the rejection of claim 47 which depends therefrom and is not separately argued apart from claim 46, is sustained.

With respect to the rejection of claim 51 as being anticipated by Kenyon, the appellant argues on page 8 of the reply brief[5] that "Kenyon utilizes predetermined

---

[4] We find no requirement in claim 46 that the logic control circuit perform an arithmetic function.

[5] The appellant did not present any argument specifically directed to this claim in the brief.

speed switching, while claim 55 [*sic*: 51] in contrast specifies higher and lower speed regions of system operation for charging utilizing the engine." Kenyon's engine runs constantly while the vehicle is running. In highway driving, the engine 10 is coupled to the differential 14 via clutch 12 and thus propels the vehicle and the circuit to the electric motor 54 is broken by a switch 80. In city driving, on the other hand, clutch 12 de-couples the engine from the differential 14 and switch 80 is closed, permitting motor 54 alone to propel the vehicle. According to Kenyon, the clutch change can be accomplished by speed sensing devices. See the paragraph bridging columns 4 and 5. From this disclosure, it is apparent that Kenyon's engine propels the vehicle at higher (highway) speeds. As for the engine being operatively connected through a charging path for charging the battery at lower speeds, Kenyon's engine 10 is coupled to alternator 34 via belt 36 and pulleys 26, 30. When the output of the alternator 34 is connected in parallel with the output of the battery pack, which occurs when the accelerator foot pedal is not being depressed for sudden acceleration (see column 4, lines 14-20 and 34-49), the alternator is merely a charging means for the battery 50. Thus, the engine is operatively connected through a charging path, including the alternator, for charging the battery whenever the accelerator pedal is not being depressed for sudden acceleration, either at higher speeds or lower speeds. We see nothing in the language of claim 51 which requires the operative connection of the engine for charging the battery to occur only at lower speeds. We thus do not find the

appellant's argument persuasive that claim 51 is not anticipated by Kenyon. The rejection of claim 51 is therefore sustained.

Claim 55 recites, *inter alia,* a step of rapidly capturing power from an internal combustion engine to charge a "fast charge-discharge battery." Kenyon is silent with respect to the type of battery used for the battery pack 50. The examiner's position that the limitation "fast charge-discharge battery" has such breadth that it fails to define over any rechargeable battery used for automotive purposes" (answer, page 14) is not well taken. As discussed above, the appellant has clearly defined "fast charge-discharge battery" as a battery capable of faster charge than the current lead acid batteries (specification, page 7) and the examiner has not provided any explanation or evidence to show that the battery pack 50 is necessarily capable of faster charge than current lead acid batteries to establish a case of inherency. It follows that we cannot sustain the examiner's rejection of claim 55 as being anticipated[6] by Kenyon.

With respect to the rejection of claim 61 as being anticipated by Kenyon, the means for coupling the power transfer means for transferring power from the motor to the drive wheels would appear to read on the differential 60 of Kenyon and the means for uncoupling the power transfer means for transferring power from the engine from the drive wheels of the vehicle would appear to read on clutch 12 of Kenyon. Thus,

---

[6] The issue of whether it would have been obvious to use a fast charge-discharge battery in the Kenyon vehicle to arrive at the subject matter of claim 55 is not before us in this appeal.

Kenyon in fact appears to disclose the structure alleged by appellant to be lacking (brief, page 7). Further, that claim 61 was earlier indicated to be allowable has no relevance to the determination of whether the standing rejection is appropriate (see page 7 of the reply brief). The rejection is sustained.

We shall not sustain the rejection of claim 37 as being anticipated by Lynch. Lynch discloses only a single element, a motor-generator 12, connected to the same shaft 18 as an internal combustion engine 20, the motor-generator drawing current from batteries 14 and functioning as a motor at shaft speeds below a no-load speed and furnishing current to the batteries and functioning as a generator at shaft speeds above the no-load speed, rather than a separate motor and generator as called for in claim 37.

Moreover, the appellant argues that the last paragraph of the claim is not met by Lynch and we agree. Under normal circumstances, Lynch's engine transfers force to the wheels via gear box 21, clutch 23 and transmission 22, while also being operatively connected, at all times, to the motor-generator 12, which acts as a generator at high speeds (above the no-load speed), with force transferred from the engine 20, and as a motor at low speeds (below the no-load speed). Under such circumstances, with output from the engine always being transferred to the wheels, regardless of speed, Lynch lacks any control means for controlling whether to transfer driving force from the engine to a generator or wheels in accordance with a vehicle running state. The only time the engine does not transfer driving force to the wheels is when clutch 23 disengages the

engine from the transmission and drive train so that the engine may operate the generator separately (see column 4, lines 42-45).[7] Lynch does not disclose what would cause the clutch to disengage the engine from the transmission in this manner. It is thus not clear that such disengagement is in accordance with a vehicle running state, with the transfer of force from the engine to the wheels (clutch engaged) occurring when such running state is more than a predetermined value as called for in claim 37. In any event, such control of the clutch 23 does not appear to be part of a control function for selecting between transfer of engine driving force to the wheels and to a generator depending on whether a running state is more or less than a predetermined value, as recited in claim 37.

Claim 40 depends from claim 37. Having determined that the rejection of claim 37 as being anticipated by Lynch cannot be sustained, it follows that we also cannot sustain the rejection of dependent claim 40.

With respect to the rejection of claim 50 as being anticipated by Lynch, the appellant argues that claim 50 defines a cruise mode not seen in Lynch (brief, page 7; reply brief, page 9). At speeds below the no-load speed, the motor-generator 12 acts as a motor, thus contributing torque to the propulsion of the vehicle (an electric motor propulsion system) and, at speeds above the no-load speed, acts as a generator,

---

[7] In this case, of course, the motor-generator, mounted on the same shaft as the engine, is also disengaged from the transmission and wheels.

driven by the power generated by the engine 20, to supply current to the batteries, such that the engine alone propels the vehicle (engine propulsion when in cruise mode). As for the conditions under which the cruise mode occurs, Lynch points out that, when external forces, such as an upgrade, increase the load on the engine and cause the engine to slow down below 2500 RPM, the motor-generator supplies torque to the shaft. Conversely, when outside influences, such as the vehicle traveling downhill or slowing for a traffic light, decrease the load on the engine and speed the engine up beyond 2500 RPM, the drive shaft transmits this speed to the motor-generator, which will act as a generator (column 3, lines 23-47; column 8, lines 43-63), in which case the vehicle will be propelled solely by the engine. The examiner states on page 14 of the answer that, when the vehicle needs to accelerate or go uphill (high load levels), the motor-generator, acting as a motor, supplements vehicle power and the appellant has not disputed this statement. As such, the cruise mode, i.e., the mode in which the vehicle is propelled solely by the engine, occurs when high loads, such as rapidly shifting power and speed demands, are not occurring for some predetermined periods of time, that is, the response time of the system. The rejection is sustained.

With respect to claim 51, the appellant argues on page 9 of the reply brief[8] that speed variations above and below no load speed control the flow of power to and from

---

[8] We note that the appellant's brief did not include any specific argument with respect to this rejection of claim 51.

the batteries in Lynch, not higher and lower vehicle speeds as claim 51 requires. To the extent that this is an argument that Lynch uses shaft speeds, rather than vehicle speeds, to control the switching of the motor-generator between motor and generator mode, we note that claim 51 simply refers to higher and lower "speeds," not higher and lower "vehicle speeds." As pointed out above, the engine alone powers the vehicle at higher speeds (above the no-load speed) and the motor contributes torque to help propel the vehicle at lower speeds (below the no-load speed). The engine is always operatively connected on the same shaft as the motor-generator so as to drive the motor-generator to charge the batteries whenever the motor-generator is operating above its no-load speed. As disclosed by Lynch (column 7, lines 39-44), when a charge sensor detects that the charge in the batteries is low, the charge sensor causes the field exciter 15 to increase the field slightly to lower the no-load speed of the motor-generator which puts the motor-generator into generator mode at a lower speed. As such, the engine is operatively connected through a charging path for charging the battery at lower speeds, as called for in the claim. Accordingly, we conclude that Lynch fully responds to the limitations of claim 51. The rejection is sustained.

Claim 54 calls for a logic control circuit responsive to both vehicle speed and accelerator pedal information for providing cruise mode logic output signals for controlling the operation of the motor and the engine. Lynch's hybrid vehicle relies solely on shaft speed and does not utilize accelerator pedal information to control the

operation of the motor and engine. While accelerator pedal activity may affect shaft speed, the control system of Lynch is responsive solely to the shaft speed, and not the accelerator pedal information itself, to control the motor-generator and engine. This rejection is reversed.

The appellant's argument with respect to the rejections of claims 55 and 59 as being anticipated by Lynch is that Lynch does not use a fast charge-discharge battery as called for in the claims (brief, page 8; reply brief, pages 9 and 10). For the reasons which follow, we cannot sustain the rejection of these claims as being anticipated by Lynch.

The examiner's position (answer, page 15) that the terminology "fast charge-discharge battery" is so broad as to read on any rechargeable automotive battery is untenable in light of the express definition thereof in the present specification (page 7), as discussed above. The examiner also points to Lynch's disclosure in column 5, lines 17-18, that "[t]he batteries should be designed for short duration, high current discharge and a low internal resistance." Lynch also discloses that "[t]his can be achieved by using standard automotive starting batteries with a large number of thin plates" (column 5, lines 18-20). While this disclosure appears to us to provide ample motivation for one of ordinary skill in the art to use batteries capable of faster charge than current lead

acid batteries,[9] it does not dictate that batteries capable of such charge rate are necessarily used by Lynch so as to establish a case of inherency.

The appellant argues (brief, page 8) that claim 57 is not anticipated by Lynch because Lynch allegedly lacks the step of utilizing the engine power in the cruise mode and utilizing the motor power primarily when conditions for the cruise mode are not satisfied, the cruise mode occurring when rapidly shifting power and speed demands are not occurring. For the reasons discussed above with respect to the rejection of claim 50 as being anticipated by Lynch, we do not find this argument persuasive. The rejection of claim 57 as being anticipated by Lynch is sustained.

We shall not sustain the examiner's 35 U.S.C. § 102 rejection of claim 58 as being anticipated by Lynch. For the reasons expressed above in our affirmance of the examiner's rejection of this claim under 35 U.S.C. § 112, second paragraph, claim 58 is indefinite. Therefore, the prior art rejection must fall because it is necessarily based on speculative assumption as to the meaning of the claim. See Steele, 305 F.2d at 862-63, 134 USPQ at 295. It should be understood, however, that our decision in this regard is based solely on the indefiniteness of the claimed subject matter, and does not reflect on the adequacy of the prior art evidence applied in support of the rejection.

---

[9] A rejection of claims 55 and 59 as being unpatentable over Lynch under 35 U.S.C. § 103 is not before us in this appeal.

Claim 60 recites a step of controlling operation of the vehicle in the cruise mode including controlling the operation of the motor and engine in response to vehicle operating parameters. The operation of the motor-generator is controlled in response to vehicle shaft speed. The engine is consequently also controlled in response to vehicle shaft speed, as the operation of the motor-generator in generator mode places a slight load on the engine and the operation of the motor-generator as a motor contributes torque to decrease the load on the engine. Shaft speed is therefore one vehicle operating parameter in response to which the engine and motor are controlled. The battery charge is a second parameter, as the no-load speed of the motor-generator is reduced in response to detection of low battery charge (column 7, lines 39-50). The rejection of claim 60 as being anticipated by Lynch is sustained.

The Obviousness Rejections

Claim 41 stands rejected as being unpatentable over Ellers.[10] Claim 41 depends ultimately from claim 37 and further recites that the running state is vehicle speed and that the vehicle speed is 40 miles per hour. It appears that the intent of claim 41 is to specify that the predetermined value of the vehicle speed (running state) is 40 miles per hour and we have interpreted it as such for purposes of this appeal. We cannot sustain the rejection of claim 41 for the reasons stated above in our discussion of the rejection

[10] We note that claim 41 depends from claim 40 which, curiously, has not been rejected as being either anticipated by or unpatentable over Ellers.

of claim 37 as being anticipated by Ellers. Simply stated, Ellers does not teach or suggest the last paragraph of claim 37.

Claim 56 stands rejected as being unpatentable over Lynch. The examiner concedes that Lynch fails to disclose a nickel cadmium fast charge-discharge battery but contends that the use of a nickel cadmium battery would have been obvious, "since it has been held to be within the general skill level of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See In re Leshin, 125 USPQ 416" (answer, page 8).

The appellant argues that "Lynch is not a system designed for and utilizing the advantages of a fast charge-discharge battery as the storage medium" (reply brief, page 10). This statement is expressly belied by Lynch's disclosure in column 5, lines 16-18, to the effect that the batteries should be designed for "short duration, high current discharge and a low internal resistance."

As admitted on page 7 of the appellant's specification, nickel cadmium batteries are well known batteries which are capable of faster discharge than the current lead acid batteries. We thus presume that the appellant does not dispute that nickel cadmium batteries would have been recognized by one of ordinary skill in the art at the time of the appellant's invention as being capable of fast charge-discharge. The known nickel cadmium batteries would have been obvious for use in Lynch to achieve the objectives set forth by Lynch in column 5, lines 16-18.

As for the appellant's argument on page 9 of the brief that Lynch's battery is not charged when the engine is not employed to drive the motor vehicle, Lynch's engine is typically employed to drive the motor vehicle, either alone or with the assistance of the motor-generator, at all times. Thus, under most circumstances, even when the motor-generator is operating as a generator and driven by the engine to charge the battery, the engine is still employed to drive the motor vehicle. Lynch does disclose, however, that "[t]he clutch 23 may be used to disengage the engine from the transmission and drive train so that the engine may operate the generator separately" (column 4, lines 42-45). In such a circumstance, the step of utilizing the engine to charge a battery when the engine is not employed to drive the vehicle is performed by Lynch's vehicle.

For the reasons set forth above, the appellant's arguments do not persuade us that claim 56 is patentable over Lynch. The rejection is sustained.

Claim 48 stands rejected under 35 U.S.C. § 103 as being unpatentable over Kenyon in view of Ellers. The appellant argues that Kenyon lacks the logic control circuit recited in claim 46, from which claim 48 depends and, further, that Ellers concerns low battery operation in a series hybrid and, as such, it is not seen how this teaching could be applied to the parallel hybrid system of Kenyon (brief, pages 9-10). Further, appellant argues, claim 48 relates to the condition of an inoperable motor, not low battery determination as in Ellers (brief, page 10).

As discussed above with regard to the anticipation rejection of claim 46, from which claim 48 depends, based on Kenyon, Kenyon discloses opening the circuit to the motor and coupling the engine to differential 14 using a one-way clutch in highway driving and de-coupling the engine from the differential and closing the circuit to the motor to have the motor alone propel the vehicle in city driving, with clutching and switching to open and close the motor circuit being accomplished automatically by well known speed sensing devices (column 4 to column 5). The engine continues to run, transferring power to the alternator, and the motor is powered, transferring torque to wheels, when the engine is de-coupled from the differential 14 by the clutching/switching circuit. Stated differently, the torque path from the engine to the traction wheels is interrupted without interrupting the operation of the engine or the application of torque from the motor to the wheels. This responds fully to the logic control circuit limitation of claim 46.

In highway driving conditions, Kenyon's clutch 12 couples the engine to the differential, and hence the traction wheels, so that torque is transferred from the engine to the wheels. Kenyon provides no indication that this would not be the case in the event of an inoperable electric motor. Thus, in highway conditions, the torque transfer from the engine to the wheels would occur in the event of an inoperable electric motor. Accordingly, claim 48, like claim 46, is in fact anticipated by Kenyon. A disclosure that anticipates under 35 U.S.C. § 102 also renders the claim unpatentable under 35 U.S.C.

§ 103, for "anticipation is the epitome of obviousness." Jones v. Hardy, 727 F.2d 1524, 1529, 220 USPQ 1021, 1025 (Fed. Cir. 1984). See also In re Fracalossi, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982); In re Pearson, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974). Thus, we sustain the examiner's rejection of appealed claim 48 under 35 U.S.C. § 103. The additional teachings of Ellers are simply superfluous to the rejection.

NEW GROUND OF REJECTION

The following new ground of rejection is entered pursuant to 37 CFR § 41.50(b).

Claims 55 and 59 are rejected under 35 U.S.C. § 103 as being unpatentable over Lynch in view of the admission on page 7 of the appellant's specification that nickel cadmium batteries were known in the art at the time of the appellant's invention and are "fast charge-discharge" batteries.

When the motor-generator 12 of Lynch is operating at speeds above the no-load speed, it acts as a generator and puts a load on the internal combustion engine which brings the speed of the engine back toward the no-load speed and at the same time converts any excess engine power into electric energy to be stored in the batteries. As such, Lynch's hybrid vehicle captures power from a continuously running low horsepower engine (see column 9, lines 7-8) without loss of power to the vehicle, as called for in step a of claim 55, and transfers power output from the engine into electric power conserved in the battery, as recited in step b of claim 59.

As for the step "providing instant powerful acceleration by operator depression of the throttle pedal to provide electric propulsion while in the cruise mode when the speed of the vehicle is dropping" in claim 55 and the step of causing a battery to power the electric motor on throttle demand in claim 59, Lynch discloses that, when the engine is subjected to increasing loads, such as those encountered when the vehicle begins ascending a hill and sudden acceleration is demanded to counter the dropping vehicle speed, the increased load causes the engine to slow down below its preferred speed, which is also the no-load speed of the motor-generator, and the motor-generator functions as a motor and transfers energy from the storage battery to the drive shaft, thereby increasing the speed of the vehicle and, hence, of the engine back toward its preferred speed. See column 3, third paragraph.

Lynch also discloses that "[t]he batteries should be designed for short duration, high current discharge and have low internal resistance" (column 5, lines 16-18). This would have provided ample motivation for one of ordinary skill in the art to use known batteries, such as nickel cadmium batteries, which appellant admits on page 7 of the specification were known in the art at the time of the appellant's invention and are "fast charge-discharge" batteries as that terminology is used by the appellant, for the storage batteries 14.

CONCLUSION

To summarize,

the rejection under 35 U.S.C. § 112, second paragraph, is affirmed as to claims 49 and 58 and reversed as to claims 46-48, 55, 57, 60 and 61;

the anticipation rejection based on Ellers is affirmed as to claims 34-36, 50, 54, 57, 60 and 61 and reversed as to claims 37, 58 and 59;

the anticipation rejection based on Kenyon is affirmed as to claims 46, 47, 51 and 61 and reversed as to claims 37, 40 and 55;

the anticipation rejection based on Lynch is affirmed as to claims 50, 51, 57 and 60 and reversed as to claims 37, 40, 54, 55, 58 and 59;

the rejection of claim 41 under 35 U.S.C. § 103 is reversed;

the rejections of claims 56 and 48 under 35 U.S.C. § 103 are affirmed; and

a new rejection of claims 55 and 59 is entered pursuant to 37 CFR § 41.50(b).

Regarding the affirmed rejection(s), 37 CFR § 41.52(a)(1) provides "[a]ppellant may file a single request for rehearing within two months from the date of the original decision of the Board."

In addition to affirming the examiner's rejection(s) of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office

21 (September 7, 2004)). 37 CFR § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 CFR § 41.50(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

Should the appellant elect to prosecute further before the examiner pursuant to 37 CFR § 41.50(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejections, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejections are overcome.

If the appellant elects prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART; 37 CFR § 41.50(b)

JOHN P. MCQUADE
Administrative Patent Judge

JEFFREY V. NASE
Administrative Patent Judge

JENNIFER D. BAHR
Administrative Patent Judge

) BOARD OF PATENT
) APPEALS
) AND
) INTERFERENCES

Conrad O. Gardner
1502 N. 97th Street
Seattle, WA 98103